Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claim 1 (currently amended): A method for stabilizing motion in a sequence of frames, comprising:

retrieving a group of pictures from the sequence of frames, the group of pictures comprising more than two images;

identifying ~~one or more~~ a plurality of features in a first frame in the ~~sequence of frames~~ group of pictures;

~~calculating~~ determining tracked positions for ~~one or more~~ the features in ~~each other frame~~ remaining frames in the ~~sequence of frames~~ group of pictures based on the features in the first frame;

~~calculating~~ after said determining tracked positions, determining ideal positions for the features in ~~each other frame~~ the remaining frames in the ~~sequence of frames~~ group of pictures based on the tracked positions, said determining ideal positions comprises, for each feature:

plotting its position from the first frame and its tracked positions from the remaining frames in an X, Y coordinate graph; and

drawing a motion trajectory that connects a first plotted position from the first frame to a last plotted position from a last frame in the group of pictures, wherein the ideal positions are located on the motion trajectory;

identifying transformation information based on the tracked positions and the ~~calculated~~ ideal positions; ~~and~~

transforming ~~each other frame~~ the remaining frames in the ~~sequence of frames~~ group of pictures by adjusting pixels in ~~each other frame~~ the remaining frames based on the transformation information; and

repeating for remaining groups of pictures in the sequence of frames.

Claim 2 (original): The method of claim 1, further comprising:

determining whether the sequence of frames was recorded with fast camera motion or slow camera motion.

Claim 3 (currently amended): The method of claim 2, ~~further comprising~~ wherein said determining tracked positions comprises:

when it is determined that the sequence of frames was recorded with fast camera motion, performing matching to ~~calculate tracked positions for each feature~~ determine estimated positions for the features in a second frame in the ~~sequence of frames~~ group of pictures.

Claim 4 (currently amended): The method of claim 3, wherein said performing matching ~~further~~ comprises:

identifying ~~one or more~~ new features in the second frame; and

matching the ~~one or more~~ features in the first frame to the ~~one or more~~ new features in the second frame.

Claim 5 (currently amended): The method of claim [[2]] 3, ~~further comprising~~ wherein said determining tracked positions further comprises:

when it is determined that the sequence of frames was recorded with slow camera motion, performing global tracking to ~~calculate~~ determine the estimated positions for ~~each of~~ the ~~one or more~~ features in the second frame.

Claim 6 (currently amended): The method of claim 5, wherein said performing global tracking ~~further~~ comprises:

~~selecting a first feature in the first frame; and~~

~~searching a portion of the second frame to find a feature that corresponds to the selected first feature in the first frame~~

searching a plurality of large areas in the second frame to determine the estimated positions for the features in the second frame, the large areas being centered at positions in the second frame that correspond to positions of the features in the first frame.

Claim 7 (currently amended): The method of claim [[1]] 6, wherein ~~calculating~~ said determining tracked positions further comprises:

performing local tracking based on the estimated positions of the features in the second frame to determine the tracked positions of the features in the second frame, wherein said performing local tracking comprises searching a plurality of small areas in the second frame to determine the tracked positions of the features in the second frame, the small areas being centered at the estimated positions of the features in the second frame.

Claim 8 (canceled).

Claim 9 (currently amended): The method of claim [[8]] 1, wherein ~~the motion trajectory is linear~~ said drawing a motion trajectory comprises drawing a linear motion trajectory.

Claim 10 (currently amended): The method of claim [[8]] 1, wherein ~~the motion trajectory is non-linear~~ said drawing a motion trajectory comprises drawing a non-linear motion trajectory.

Claim 11 (canceled).

Claim 12 (currently amended): The method of claim [[11]] 1, wherein an ideal position for a ~~point of interest~~ feature has a same X-coordinate and a different Y-coordinate as compared to a tracked position for the ~~point of interest~~ feature.

Claim 13 (currently amended): The method of claim 1, wherein the transformation information comprises rotation, scaling, shearing, and/or translation information for each pixel of ~~each other frame~~ the remaining frames in the ~~sequence of frames~~ group of pictures.

Claim 14 (currently amended): The method of claim 13, wherein said transforming ~~each other frame further~~ the remaining frames comprises:

adjusting each pixel in each ~~other~~ frame based on the rotation, scaling, shearing, and/or translation information.

Claim 15 (currently amended): The method of claim 1, wherein said transforming ~~each other frame~~ the remaining frames in the group of pictures ~~sequence of frames further~~ comprises:

performing affine transformation using the tracked positions and the ideal positions.

Claim 16 (currently amended): The method of claim 15, wherein said performing affine transformation ~~further~~ comprises:

> determining values of coefficients representing rotation, scaling, shearing, and/or translation information using the tracked positions and the ideal positions.

Claim 17 (currently amended): The method of claim 16, wherein said performing affine transformation further ~~comprising~~ comprises:

> applying the values of the coefficients to each pixel of the first frame to obtain positions of each pixel in a second frame in the group of pictures.

Claim 18 (original): The method of claim 1, further comprising:

> performing frame averaging.

Claim 19 (original): The method of claim 1, further comprising:

> performing frame sharpening.

Claim 20 (currently amended): A method for stabilizing a sequence of frames, comprising:

> calculating a first position of a point of interest in a first frame;

> identifying estimated positions of points of interest in a second frame and a third frame that correspond to the point of interest in the first frame;

> identifying tracked positions of points of interest in the second frame and the third frame based on the estimated positions of the point of interest, wherein the tracked positions comprise a second position for the point of interest in the second frame and a third position for the point of interest in the third frame;

> after said identifying tracked positions, plotting the first position, the second position, and the third position on an X,Y coordinate graph; and

> connecting the first position to the third position on the X,Y coordinate graph, wherein ideal positions of the point of interest in the first frame, second frame, and third frame lie on the connection.

Claim 21 (original): The method of claim 20, further comprising:

performing affine transformation to adjust each pixel in the second frame and third frame based on the ideal positions.

Claim 22 (currently amended): The method of claim 21, wherein said performing affine transformation ~~further~~ comprises:

determining values of coefficients representing rotation, scaling, shearing, and/or translation information using the tracked positions and the ideal positions.

Claim 23 (currently amended): The method of claim 22, wherein said performing affine transformation further ~~comprising~~ comprises:

applying the values of the coefficients to each pixel of the first frame to obtain positions of each pixel in the second frame.

Claim 24 (original): The method of claim 20, further comprising:

determining whether to perform global tracking or matching to generate estimated positions of points of interest.

Claim 25 (currently amended): The method of claim 24, wherein ~~the determination~~ said determining is based on whether camera motion for the sequence of frames is fast or slow.

Claim 26 (currently amended): A system, comprising:

a computer including a processor and a memory;

a sequence of frames stored in the memory;

a program stored in the memory of the computer, wherein the program is executed by the processor of the computer to:

retrieve a group of pictures from the sequence of frames, the group of pictures comprising more than two images;

identify ~~one or more~~ a plurality of features in a first frame in the ~~sequence of frames~~ group of pictures;

~~calculate~~ determine tracked positions for ~~one or more~~ the features in ~~each other frame~~ remaining frames in the ~~sequence of frames~~ group of pictures based on the features in the first frame;

~~calculate~~ after said determine tracked positions, determine ideal positions for the features in ~~each other frame~~ the remaining frames in the ~~sequence of frames~~ group of pictures based on the tracked positions, said determining ideal positions comprises, for each feature:

    plotting its position from the first frame and its tracked positions from the remaining frames in an X, Y coordinate graph; and

    drawing a motion trajectory that connects a first plotted position from the first frame to a last plotted position from a last frame in the group of pictures, wherein the ideal positions are located on the motion trajectory;

identify transformation information based on the tracked positions and the ~~calculated~~ ideal positions; ~~and~~

transform ~~each other frame~~ the remaining frames in the ~~sequence of frames~~ group of pictures by adjusting pixels in ~~each other frame~~ the remaining frames based on the transformation information; and

repeat for remaining groups of pictures in the sequence of frames.

Claim 27 (original): The system of claim 26, further comprising:

    a video camera for recording the sequence of frames.

Claims 28 (currently amended): The system of claim 27, wherein ~~execution of the program further comprises~~ the program is executed by the processor of the computer to further:

    ~~determining~~ determine whether the sequence of frames was recorded with fast camera motion or slow camera motion.

Claim 29 (currently amended): The system of claim 28, wherein ~~execution of the program further~~ said determine tracked positions comprises:

when it is determined that the sequence of frames was recorded with fast camera motion, performing matching to ~~calculate tracked positions for each feature~~ <u>determine estimated positions for the features</u> in a second frame in the ~~sequence of frames~~ <u>group of pictures</u>.

Claim 30 (currently amended): The system of claim 29, wherein ~~execution of the program~~ <u>said performing matching</u> further comprises:

identifying ~~one or more~~ <u>new</u> features in the second frame; and

matching the ~~one or more~~ features in the first frame to the ~~one or more~~ <u>new</u> features in the second frame.

Claim 31 (currently amended): The system of claim [[28]] <u>29</u>, wherein ~~execution of the program~~ <u>said determine tracked positions</u> further comprises:

when it is determined that the sequence of frames was recorded with slow camera motion, performing global tracking to ~~calculate~~ <u>determine the</u> estimated positions for ~~each of~~ the ~~one or more~~ features in the second frame.

Claim 32 (currently amended): The system of claim 31, wherein ~~execution of the program further~~ <u>said performing global tracking</u> comprises:

~~selecting a first feature in the first frame; and~~

~~searching a portion of the second frame to find a feature that corresponds to the selected first feature in the first frame~~

<u>searching a plurality of large areas in the second frame to determine the estimated positions for the features in the second frame, the large areas being centered at positions in the second frame that correspond to positions of the features in the first frame.</u>

Claim 33 (currently amended): The system of claim [[27]] <u>32</u>, wherein ~~execution of the program~~ <u>said determine tracked positions</u> further comprises:

~~plotting the tracked positions in an X, Y coordinate graph; and~~

~~drawing a motion trajectory by connecting a first one of the plotted tracked positions with a last one of the plotted tracked positions~~.

performing local tracking based on the estimated positions of the features in the second frame to determine the tracked positions of the features in the second frame, wherein said performing local tracking comprises searching a plurality of small areas in the second frame to determine the tracked positions of the features in the second frame, the small areas being centered at the estimated positions of the features in the second frame.

Claim 34 (currently amended): The system of claim [[33]] 26, wherein ~~the motion trajectory is linear~~ said drawing a motion trajectory comprises drawing a linear motion trajectory.

Claim 35 (currently amended): The system of claim [[33]] 26, wherein ~~the motion trajectory is non-linear~~ said drawing a motion trajectory comprises drawing a non-linear motion trajectory.

Claim 36 (canceled).

Claim 37 (currently amended): The system of claim [[27]] 26, wherein ~~execution of the program further~~ said transform the remaining frames in the group of pictures comprises:

performing affine transformation using the tracked positions and the ideal positions.

Claim 38 (currently amended): The system of claim 37, wherein ~~execution of the program further~~ said performing affine transformation comprises:

determining values of coefficients representing rotation, scaling, shearing, and/or translation information using the tracked positions and the ideal positions.

Claim 39 (currently amended): The system of claim 38, wherein ~~execution of the program~~ said performing affine transformation further comprises:

applying the values of the coefficients to each pixel of the first frame to obtain positions of each pixel in a second frame in the group of pictures.

Claim 40 (original): The system of claim 38, wherein execution of the program further comprises:

performing frame averaging; and

performing frame sharpening.

Claim 41 (currently amended): A system, comprising:

a camera;

a sequence of frames captured by the camera;

a computer with a processor and a memory, wherein a sequence of frames is stored in the memory of the computer; ~~and~~

<u>means for determining a position of a feature in a first frame in a group of pictures in the sequence of frames, the group of pictures comprising more than two frames;</u>

<u>means for identifying estimated positions of the feature in remaining frames in the group of pictures;</u>

means for performing local tracking to obtain tracked positions for [[a]] <u>the</u> feature in ~~multiple~~ <u>the remaining</u> frames ~~of the sequence of frames~~ <u>based on the estimated positions</u>;

means for ~~calculating~~ <u>determining</u> ideal positions for the feature in ~~each of the multiple~~ <u>the remaining</u> frames <u>based on the tracked positions after said performing local tracking, said determining ideal positions comprises</u>:

> <u>plotting the position from the first frame and the tracked positions from the remaining frames in an X, Y coordinate graph;</u>

> <u>drawing a motion trajectory that connects a first plotted position from the first frame to a last plotted position from a last frame in the group of pictures, wherein the ideal positions are located on the motion trajectory;</u>

means for identifying transformation information based on the tracked positions and the ideal positions ~~for each~~ <u>of the</u> feature in the ~~one or more features~~ <u>the remaining frames</u>; and

means for transforming ~~each other frame~~ <u>the remaining frames</u> by adjusting pixels in ~~each other frame~~ <u>the remaining frames</u> based on the transformation information.

Claim 42 (currently amended): The system of claim 41, further comprising:

means for, when it is determined that the sequence of frames was recorded with fast camera motion, performing matching to identify <u>the</u> estimated positions ~~for features~~ <u>of the feature</u> in ~~a frame~~ <u>the remaining frames</u>.

Claim 43 (currently amended): The system of claim 41, further comprising:

means for, when it is determined that the sequence of frames was recorded with slow camera motion, performing global tracking to identify the estimated positions ~~for features~~ of the feature in ~~a frame~~ the remaining frames.

Claim 44 (canceled).

Claim 45 (currently amended): The system of claim 41, wherein the transforming information comprises rotation, scaling, shearing, and/or translation information for each pixel of a frame.

Claim 46 (canceled).

Claim 47 (currently amended): The system of claim [[46]] 41, wherein the ideal positions ~~comprise positions~~ are located on the motion trajectory.

Claim 48 (currently amended): A computer readable storage medium encoded with software instructions, wherein execution of the instructions comprises:

retrieving a group of pictures from the sequence of frames, the group of pictures comprising more than two images;

identifying ~~one or more~~ a plurality of features in a first frame in the ~~sequence of frames~~ group of pictures;

~~calculating~~ determining tracked positions for ~~one or more~~ the features in ~~each other frame~~ remaining frames in the ~~sequence of frames~~ group of pictures based on the features in the first frame;

~~calculating~~ after said determining tracked positions, determining ideal positions for the features in ~~each other frame~~ the remaining frames in the ~~sequence of frames~~ group of pictures based on the tracked positions, said determining ideal positions comprises, for each feature:

plotting its position from the first frame and its tracked positions from the remaining frame in an X, Y coordinate graph; and

drawing a motion trajectory that connects a first plotted position from the first frame to a last plotted position from a last frame in the group of pictures, wherein the ideal positions are located on the motion trajectory;

identifying transformation information based on the tracked positions and the ~~calculated~~ ideal positions; ~~and~~

transforming ~~each other frame~~ the remaining frames in the ~~sequence of frames~~ group of pictures by adjusting pixels in ~~each other frame~~ the remaining frames based on the transformation information; and

repeating for remaining groups of pictures in the sequence of frames.

Claim 49 (original): The computer readable storage medium of claim 48, wherein execution of the instructions further comprises:

determining whether the sequence of frames was recorded with fast camera motion or slow camera motion.

Claim 50 (currently amended): The computer readable storage medium of claim 49, wherein ~~execution of the instructions further~~ said determining tracked positions comprises:

when it is determined that the sequence of frames was recorded with fast camera motion, performing matching to ~~calculate~~ determine estimated positions for ~~each feature~~ the features in a second frame in the ~~sequence of frames~~ group of pictures.

Claim 51 (currently amended): The computer readable storage medium of claim 50, wherein ~~execution of the instructions to perform matching further~~ said performing matching comprises:

identifying ~~one or more~~ new features in [[a]] the second frame; and

matching the ~~one or more~~ features in the first frame to the ~~one or more~~ new features in the second frame.

Claim 52 (currently amended): The computer readable storage medium of claim [[48]] 50, wherein ~~execution of the instructions~~ said determining tracked positions further comprises:

when it is determined that the ~~video segment~~ sequence of frames was recorded with slow camera motion, performing global tracking to ~~calculate~~ determine the estimated positions for ~~each features~~ the feature in [[a]] the second frame in the ~~sequence of frames~~ group of pictures.

Claim 53 (currently amended): The computer readable storage medium of claim 52, wherein ~~execution of the instructions to further perform global tracking further~~ said performing global tracking comprises:

~~selecting a first feature in the first frame; and~~

~~searching a portion of the second frame to find a feature that corresponds to the selected first feature in the first frame~~

searching a plurality of large areas in the second frame to determine the estimated positions for the features in the second frame, the large areas being centered at positions in the second frame that correspond to positions of the features in the first frame.

Claim 54 (currently amended): The computer readable storage medium of claim [[48]] 53, wherein ~~calculating~~ said determining tracked positions further comprises:

performing local tracking based on the estimated positions of the features in the second frame to determine the tracked positions of the features in the second frame, wherein said performing local tracking comprises searching a plurality of small areas in the second frame to determine the tracked positions of the features in the second frame, the small areas being centered at the estimated positions of the features in the second frame.

Claims 55 and 56 (canceled).

Claim 57 (currently amended): The computer readable storage medium of claim 48, wherein the transformation information comprises rotation, scaling, shearing, and/or translation information for each pixel of ~~each other frame~~ the remaining frames in the ~~sequence of frames~~ group of pictures.

Claim 58 (currently amended): The computer readable storage medium of claim 48, wherein said transforming ~~each other frame~~ the remaining frames in the ~~sequence of frames further~~ group of pictures comprises:

performing affine transformation using the tracked positions and the ideal positions.

Claim 59 (currently amended): The computer readable storage medium of claim 58, wherein said performing affine transformation ~~further~~ comprises:

> determining values of coefficients representing rotation, scaling, shearing, and/or translation information using the tracked positions and the ideal positions.

Claim 60 (currently amended): The computer readable storage medium of claim 48, wherein said performing affine transformation further comprising:

> applying the values of the coefficients to each pixel of the first frame to obtain positions of each pixel in a second frame in the group of pictures.

Claim 61 (new): The method of claim 4, wherein said matching the features in the first frame to the new features in the second frame comprises:

> determining a distance histogram and a direction histogram to neighboring features within an area of each of the features in the first frame and the new features in the second frame; and

> determining correspondences between the features in the first frame and the new features in the second frame by comparing their distance and direction histograms.

Claim 62 (new): The method of claim 61, wherein said searching a plurality of large areas comprises:

> determining correspondences between the positions of the features in the first frame and the estimated positions of the features in the second frame by comparing values of neighboring pixels of each feature in the first frame with values of neighboring pixels centered about each pixel in a corresponding large area in the second frame.

Claim 63 (new): The method of claim 62, wherein said searching a plurality of small areas comprises:

> determining correspondences between the features in the first frame and the features at the estimated positions in the second frame by comparing values of neighboring pixels of each feature in the first frame with values of neighboring pixels centered about each pixel in a corresponding small area in the second frame.